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GEOGRAPHICAL RECORD.

AFRICA.

THE GREAT CONGO FOREST.—Mr. J. Penman Browne, who recently travelled through the Ituri forest along the upper Ituri River, in the northeastern part of the Congo basin, has an article on the forest and river in the *Scottish Geographical Magazine* (Feb., 1907). He says that the forest offers immense possibilities to the naturalist. It has an area of some hundreds of square miles, and is inhabited only by Pygmies and, around its fringe, by rubber-hunters. Parts of it contain many valuable woods, such as African mahogany, teak, greenheart, camwood, copalwood, ebony, ironwood, and many species of *Landolphias* (rubber vines). Orchids are very numerous, and ferns are plentifully distributed. The Belgians have surveyed a railway through the forest; but the exploitation of this region need not wait for the construction of this highway, as a part of the forest is in close proximity to the Albert Nyanza. Timber and produce could be shipped across the lake to Uganda or taken down the Nile.

That rare and beautiful animal, the okapi, finds a home in the forest, where it is next to impossible for a white man to hunt among the dense growths. The okapi, therefore, will be safe from extermination for many years to come. The Pygmies say that, if disturbed, the okapi does not run far, and that its habits are similar to those of a forest hog. It is often found wallowing in a mud puddle. It feeds on young shoots and shrubs and on succulent roots, which it digs up with its forefeet.

There are a great many small animals in the forest amid the dense undergrowth, where no large or medium-sized animal could force a way. The known natural resources of the Ituri are rubber and timber in the forest regions, native grain, bananas, etc. Gold is as yet the only valuable mineral discovered.

NOTES ON THE GEOLOGY OF THE CONTINENT OF AFRICA.—The Topographic Section of the General Staff, War Office, Great Britain, sends to the Society this compilation of the geology of Africa made by Mr. Alexander Knox, Map Curator in the Department of the General Staff. The writer summarizes, in 36 pages, our present knowledge of the geology of Africa, with copious references to authorities on the page margins. This is followed by 329 "Notes" on the geology of many hundreds of districts, large or small, giving in each case the authority on which the note is based. Accompanying this section is a map of Africa on which the number of each note is printed, so that the reader may easily see to what particular district in the continent each note applies. A long bibliography of the geological literature of Africa, scattered through books, reports, and periodicals, is appended. The index of names makes it easy to find all references to every region, every mineral, and geological formation mentioned in the work. The volume, which has evidently been prepared with great care, will be invaluable to all students of African geology.

THE SUDAN ALMANAC FOR 1907.—This little annual, as usual, is packed with information of importance for the region it serves, and also of interest in other countries. It gives the population of the Sudan at about 1,500,000 to 2,000,000. The present population of Khartum is 14,023; Omdurman, 39,916; North Khartum, 3,664; suburbs, 16,901. The total length of the Nile from Victoria Nyanza to Damietta is computed at 3,526 miles.

GOVERNMENT FARMS IN RHODESIA.—The last annual *Report* of the British South Africa Company says that central farms have been established at selected places in the Marandellas, Sinoia, and Umtali districts, at which intending settlers may, when they desire, acquire cheaply the necessary training and experience before embarking their own capital. By these means it is hoped that a continuously increasing number of farmers of the right class will be placed upon farms. A number of intending settlers are already working at the central farms. The acreage under cultivation shows a large increase, and the agricultural exhibitions recently held in Rhodesia are evidence of the growing attention to improved methods and the adoption of the best agricultural machinery.

Matters seem to be less promising in other parts of Rhodesia. Mr. Vincent Dickins, in his paper "Journeys in South-eastern Mashonaland" (*Geog. Jour.*, January, 1907), says that during his residence of nearly eight years in Southern Rhodesia he has visited all parts of the country and finds that it has a great deal of malarial fever and black-water fever. He believes that white men cannot safely settle in Mashonaland and make homes there as in other English colonies. Farming hardly pays, as the expenses are great, and the natives can raise all the grain required far more cheaply than the white man is able to do. The country is very suitable for cattle and sheep farming, the grass being sweet and cattle thriving well on it. Many stock-raisers would settle there if the prevalent cattle diseases could be rooted out. Gold mining is gradually increasing throughout the west and north of Mashonaland and Matabeleland, which are more largely populated by whites than the south-east. It is believed that there is a good mining future before the country.

AMERICA.

RECESSION OF NIAGARA FALLS.—Under this title Dr. G. K. Gilbert has recently published a paper of more than ordinary interest.* In view of the very great geological interest in the rate of recession of Niagara, and because of the fact that this rate is now beginning to be seriously interfered with by the withdrawal of Niagara water for power purposes, Dr. Gilbert decided that the present was a favourable time for a careful consideration of the problem, which has previously been attacked by various workers, thus gaining valuable data which in the future diminished condition of volume cannot be obtained.

For this purpose Dr. Gilbert has had made a new survey of the Crest line of the Falls (by W. Carvel Hall, June, 1905), and has compared the present outline with that of previous surveys, including the earliest made under the direction of James Hall, in 1842. He has also extended the comparison of the present form back to the date of the camera lucida drawing by Captain Basil Hall in 1827. In this connection Dr. Gilbert has reoccupied, as closely as possible, the site from which Hall's drawing of the Horseshoe Fall was made, and from it has taken a photograph. He has also photographed the American Fall from the sites occupied by Hall in his camera lucida drawings of its crest line. These photographs are reproduced on pages opposite the reproduction of the camera lucida drawings, and the results of the comparison are carefully discussed in the text.

Comparing the surveys of 1842 and 1905, Dr. Gilbert finds that in the interval of 63 years there has been an average annual recession of about 5.3 feet in the Horseshoe portion of the Fall. The American Fall, with its much smaller volume, and with its protection of limestone blocks at the base, shows that the recession is not

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* Bulletin U. S. Geological Survey, Number 306.

"so great as 0.5 foot per annum, and is probably as small as 0.2 foot per annum, or about one twenty-fifth of the rate of recession of the Horseshoe Fall."

The author finds unquestionable error in the 1842 map of the American Fall, which naturally brings in question all the other results of the survey of that year. For this reason the use of Captain Basil Hall's sketch is of some importance. On this point Dr. Gilbert speaks as follows:

> The general tenor of the evidence, including the five surveys and the Basil Hall sketch, leaves no question that the annual rate of recession has been about 4 or 5 feet. If full authority be ascribed to the map of 1842, the estimated annual rate of recession is 5.3 feet. If full authority be ascribed to the tangent line, based on the sketch of 1827, the estimated rate is about 1 foot less. It is my opinion that the map affords the better record. Giving to it the greater weight and to the tangent a smaller weight, I think the best practicable estimate on the rate is between 5.3 and 4.2 feet, but nearer to the former; and I select 5 feet partly because a statement in even feet avoids the implication of high precision which might be suggested by a decimal. As an estimate of the average rate of recession during the period of definite observation, I think this can not be in error more than 1 foot. . . . The rate of recession of the American Fall during the seventy-eight years from 1827 to 1905 was less than 3 inches per annum.
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> The time consumed in the recession of the falls from the escarpment at Lewiston to their present position, or the age of the river, is not here estimated. It can not properly be computed without taking account of all conditions, local and temporary, affecting the rate of recession, and some of these conditions have varied greatly from point to point and from time to time.

Besides being illustrated by a number of excellent half-tones and by several diagrams, the paper contains a map showing the crest lines of each of the surveys from 1842 to that of 1905. In an appendix the engineer, W. Carvel Hall, describes the methods employed in his survey. R. S. T.

CLIMATE AND THE SALTON SEA.—A good deal has lately been printed in American newspapers concerning the supposed effect of the new Salton Sea upon the climate of Arizona and of other more distant localities, even as far as New Mexico and Texas. It is obviously absurd to look for any such influence, and it is well to give wide publicity to the statements on this point by Arthur P. Davis, Assistant Chief Engineer of the United States Reclamation Service, published in an article on *The New Inland Sea* (*Nat. Geogr. Mag.*, Jan., 1907). Mr. Davis points out that the great inland Gulf of California, hundreds of times larger than the Salton Sea, has no very marked influence upon the climate. "Those who hold this idea [of change of climate] apparently ignore or neglect the fact that the same causes that have led to the creation of the Salton Sea have led to the cutting down of the bed of the Colorado River and the prevention of its normal annual overflow at Yuma, and all points below there. The great delta, therefore, which is annually overflowed under normal conditions, has received no such overflow since the river has been running into the Salton Sea, at least during the past high-water season, and this fact itself would counteract any influence that might have been exerted by the evaporation from the surface of the Salton Sea." R. DEC. W.

THE SALTON SEA.—An exceedingly clear account of the history of the distinctive changes in the Colorado River in southern California is presented by Mr. Arthur P. Davis in a recent number of the National Geographic Magazine (Vol. 18, 1907, pp. 37–49). Mr. Davis says that very nearly $100,000,000 worth of property are in the balance. He points out that the existence of the depression in which the Salton Sea lies is due to the outward growth of the delta of the Colorado River, which has shut in what was once an expansion of the Gulf of California. In a humid climate this region, which lies below the sea-level, would be occupied by a large lake throughout its entire area; but in the arid climate of southern California evaporation prevents the accumulation of water, except in the lowest part of the depression where the salt sea of Salton Sink lies. Into this sink the Colorado River has been in the habit of occasionally pouring its waters, the last time before the present being in 1891. With a large river to supply water, with a downward slope for the water to be led over, and with extensive areas of fertile land for irrigation, it is natural that the project of diverting a portion of the Colorado River water into this valley should have been undertaken. For a part of the distance the irrigation canal follows an old course of the Colorado, and by this means the divergence of the Colorado water has been made more easy. Nothing can prevent the Colorado from continuing its work of destruction, either now or at some future time, excepting the construction of extensive jetties to confine the river in its channel leading to the Gulf in all seasons of flood.

Mr. Davis' paper, which is illustrated with some excellent half-tones, shows clearly the enormous extent of the destructive work of this diverted river. The steep slope to the bottom of the sink, which lies about 300 feet below sea-level, has permitted the river to cut a deep gorge, which is being rapidly extended up-stream. If the devastation is permitted to continue the ultimate result will be appalling. Whether the entire sink would be filled with water is not certain because of the lack of knowledge of the annual discharge of the Colorado and of the amount of evaporation. By one estimate, Mr. Davis shows that the entire basin may be filled in a period of forty or fifty years; by another, the basin would never be completely filled, but, instead, would be occupied by a great lake fluctuating in level as the volume of the river varied. The results of either of these conditions, however, would be enormously destructive. The water would submerge 150 miles of track of the Southern Pacific Railroad, and, in the Imperial Valley alone, not less than 300,000 acres of fertile land, now occupied by a population of between 12,000 and 15,000. Fully as much land of equal value, across the line in Mexico, would also be submerged. Up to the present time much damage has actually been done, but only a beginning has been made to what may ultimately be accomplished if the Colorado is not made to remain in the channel which it has been following to the Gulf. It is truly a problem in which the Government is warranted in taking a hand. R. S. T.

Depth of Death Valley, Cal.—The U. S. Geological Survey has just completed a line of spirit-levels through Death Valley, and ascertained that the depression of that area below sea-level is not so great as was supposed. The preliminary figures for the lowest point give — 276 feet. Bennetts Well, which is near this place, is 266 feet below sea-level. The final computations may slightly alter these figures, but they are probably not more than three feet in error. The Geological Survey now has elevation marks on the highest and lowest points of dry land in the United States.

It is a strange coincidence that these two extremes are both in southern California and only 75 miles apart. Mount Whitney is a foot or two over 14,500 feet above sea-level, while Death Valley is 276 feet below. Before the Salton Sink, also in southern California, was flooded by the Colorado River, it contained the lowest point of dry land in the United States—a spot 287 feet below sea-level.

Previous estimates of the depth of Death Valley based on barometer readings gave for the lowest point figures varying from 250 to 450 feet below sea-level. The level line of the Geological Survey is the first accurate determination of elevations in that locality.

The Falkland Islands.—Climatic influence on occupations and products, as well as on habits of life, is no better illustrated than in these windswept summits of the otherwise submerged continental shelf lying eastward from southern South America. They lie in the belt of the prevailing westerlies, which are indeed "prevailing" here; for so strong is the wind and so soft is the ground, because of constant rain or fogginess, that no trees grow, and the land is covered with grass and moss. The latter has grown here for ages, and its partially decomposed remains have accumulated in extensive peat deposits. These beds can not only furnish fuel for the islanders, but also supply the growing demand on the neighbouring fuelless mainland.

The sheep-growing industry developed on the rich grasses leads all others in the islands. The chief products therefrom are skins, tallow, and wool; and the authorities are contemplating an improvement in the breed of sheep, to improve output and quality of wool, as well as the quality of flesh for eating. G. D. H.

WOLVES IN THE UNITED STATES.—Stockmen on the western cattle ranges have been suffering through depredations of wolves. The complaints of ranch men resulted last year in an investigation by the Government Forest Service, and the report prepared by Mr. Vernon Bailey has just been published as *Bulletin* 72 of the Agricultural Department. A number of photographs show wolf dens in Wyoming and other western States and also views of wolf pups playing in front of the dens.

Wolves are still abundant in Texas, New Mexico, Wyoming, Montana, and other regions, and they are doing much damage. They have rendered sheep-raising practically impossible in eastern Texas. It is estimated that four wolves on one of the creeks near the Gila Forest Reserve in 1906 killed calves worth $1,000. Arthur J. Tisdall, writing from New Mexico, calls attention to the excessive damage done by wolves all over the western States and Territories, and especially on the ranges, and expresses the belief that they are killing nearly 500,000 animals (?) annually, chiefly calves and yearling cattle.

In western North Dakota it is estimated that the annual loss is from 10 to 15 per cent. of the herds. Wyoming has in twelve years paid $68,000 in wolf bounties, and yet the animals are still destroying much stock. Colorado reports that last year wolves were killing stock in six of the large grazing regions of the State. Similar reports are coming from other parts of the West, in spite of the fierce warfare waged upon the animals by ranchmen, trappers, and hunters.

A considerable number of colts and some grown horses are killed by wolves, but the loss is insignificant compared with that of cattle. Herded sheep are rarely troubled by wolves, but when they raid an unguarded herd the havoc is likely to be great. In large parts of eastern Texas, Louisiana, and Minnesota, few sheep are raised on account of the abundance of wolves.

Hogs are killed in great numbers by wolves in the timbered bottom and swamp lands of eastern Texas and in Louisiana and Arkansas. Many deer are killed, also, in the timbered regions of northern Michigan, Wisconsin, and Minnesota, and in parts of Canada, especially during the winter when snow is deep and domestic animals are housed. On Grand Island in Lake Superior, in January, 1906, a grey wolf appeared when snow was two feet deep and in thirty days killed thirteen deer and one caribou.

Government officials hold out no hope that the various kinds of wolves can be exterminated, at least for many years to come; but protective measures, including hunting, poisoning, trapping, and searches for wolf dens in order to exterminate litters of pups, are described in detail. The belief is expressed that, by organised and vigilant war upon the wolf, his depredations may at least be kept within bounds.

SILVER MINING AT COBALT.—In the "Summary Report" of the Geological Survey of Canada for 1906, Mr. A. P. Low, Director of the Survey, briefly describes his visit to the important silver camps about Cobalt, Ontario. Three days were spent in looking over a number of the most promising mines and claims of this remarkable camp. The question of the depth to which the silver will be found is important, but no opinion can be given with the data yet available. Granting only a very moderate depth, there is ore in sight sufficient to produce millions, and only a portion of the veins has as yet been uncovered. It is wise, however, to consider the very large capitalization and abnormal prices of stock of many of these properties. Attention is also called to the limited area covered by the silver-bearing veins in this region and to the natural impulse to consider properties situated in the vicinity of bonanza claims as being themselves of great value, when the reverse is often the case.

THE HAWAIIAN ISLANDS.—Attention is again called to this important "Cross-roads of the Pacific" by a half-dozen pages (91–96) in the November number of the Monthly Consular Reports. A glance at the Pilot Chart of the North Pacific, issued monthly by the Hydrographic Office at Washington, reveals the appropriateness of the phrase quoted. The islands are an intersecting point for sixteen great steamship lines that traverse this ocean, and their importance, politically and commercially, will be enhanced in a few years by the opening of the Isthmian Canal.

Honolulu is destined to be in the tide of the world's greatest commerce, because it is in the direct line from Vancouver and Seattle to Sydney, from San Francisco to the Philippines and Hongkong, and from Panama to Japan. It is on the chief lines of trade between Occident and Orient.

The Hawaiian Territory is chiefly a one-crop agricultural country. Sugar constitutes 95% of the exports. The cultivation of cane has reached a high degree of perfection, and, with many natural advantages, the plantations produce more cane to the acre and more sugar to the ton of cane than any other country of the world. Steam ploughs in the fields, and latest steam and electric appliances at the mills, irrigation works and costly pumping stations—these are some of the items which make this eminence possible.

Other industries now being tried are pineapple, banana, mango and alligator pear growing. These and other tropical fruits do well, but have not been pushed because the people were dominated by the one idea—sugar-growing. G. D. H.

ASIA.

REPORT OF THE PHILIPPINE COMMISSION.—This Report (1906) says that the death-rate among American civilians living in the Philippines was only 9.34 per 1,000, while the death-rate among American soldiers was only 8.65. Final steps have been taken for the construction of between 700 and 800 miles of new railroad lines, which will open up much of the most populous portions of the archipelago. This work will be carried out by the Manila Railroad Company, and 428 miles of these roads will be built in Luzon. The Coast and Geodetic Survey completed 430 miles of coast surveys, making a total of 1,645 miles completed, or 14.3 per cent. of the coast-line of the islands. There were published in Washington eighteen new Philippine charts.

DR. STEIN IN CENTRAL ASIA.—In a letter, written in October last from Kiria to the *Geographical Journal* (Jan., 1907), Dr. Stein, the anthropologist, says that he began his journey southeast from Kashgar at the end of June. Khotan was the intended starting-point of his archæological labours, and there was opportunity before entering upon them for geographical work. Surveyor Ram Singh carried a systematic survey, by plane table and theodolite, through a still unexplored section of the Tashkurghan River valley, and thence along the eastern slopes of the Mustagh-ata range to the latitude of Yangi-Hisar. Stein and Ram Singh then travelled from Yarkand by an unsurveyed route, east of the Tiznaf River, to the outer hills about Kokyar. On this route Stein collected anthropological measurements and data concerning the people of Pakhpo, a small but interesting tribe of Iranian speech, living in Alpine isolation, and closely allied to the Galchas of the Pamirs.

Ram Singh also surveyed another part of the difficult mountain range between the Kara-kash and Yurung-kash rivers, crossing the main range by the Hindu-tash Pass, which several Europeans had attempted in vain. The great valley of Pusha, to which this pass gave access, has extensive grazing ground, with an abundance of vegetation quite exceptional among those barren mountains.

From Khotan Dr. Stein and Ram Singh started for the high mountains south of that place, to supplement his surveys in 1900 with ampler details concerning the great glaciers which feed the headwaters of the Khotan River. They surveyed the imposing glaciers of the Nissa valley, and the equally large ones crowding the watershed above Karanghu-tagh. Many details were cleared up and the map of this mountain region will be published by the Royal Geographical Society.

Dr. Stein's archæological campaign fairly began in the desert east of Khotan. The excavation of a ruined temple on the Tati of Hanguya yielded many interesting small terra-cotta reliefs, the style of which was plainly derived from models of Græco-Buddhist art, agreeing closely with the Rawak Stupa reliefs dated approximately from the fifth to the sixth century A.D. Cultivation in the fertile Hanguya tract is now steadily advancing towards areas previously abandoned to the desert. Much of this desolate Tati is likely to be recovered from the desert at no distant time. Dr. Stein was impressed by the considerable extension of cultivated ground during the last six years. Large areas which lay waste or were covered by drift sand in 1900–1901 have again been brought under cultivation. The great advance in prosperity, which is now taking place in the western oasis of Chinese Turkestan seems to have in Khotan a specially-marked effect on the cultivated area and the numbers of the population occupying it.

East of the Khotan oasis, at the site of Khadalik, which had furnished manuscripts of interest, Stein cleared the remains of the original structure, and recovered a large number of manuscripts on paper in Sanskrit, Chinese, and in the "unknown" language of old Khotan, besides many wooden tablets inscribed in the same language and some in Tibetan. He found large rolls of a Buddhistic text in Chinese, having on the reverse what evidently is its translation into the language of old Khotan. These rolls may supply the long-desired clue for the decipherment of that language.

Dr. Stein was about to start for his next goal eastward—the ancient site in the desert beyond Niya.

PRIMITIVE CULTURE IN JAPAN.—Mr. N. Gordon Munro, of Edinburgh University, has written a monograph with this title, which is printed in the *Transactions* of the Asiatic Society of Japan (Dec., 1906). It is an extended study of Japanese neolithic culture. Prehistoric archæology has revealed the existence of two distinct cultures in Japan, together with traces of a third. One culture is represented by numerous relics imbedded in the soil or in shell heaps. This is the primitive culture attested by the existence of about 4,000 ascertained sites of residence or refuse heaps. These are characterised by the total absence of metal and by the presence of polished, finely-chipped and roughly-hewn weapons and implements of stone, as well as of natural stones which have been applied to various uses. Pottery is nearly always found, is usually of coarse texture, and is never turned on the wheel. The remains of the second culture are found in chambers and caves specially built or excavated. It perhaps made its appearance less than 3,000 years ago, when metal had chiefly supplanted stone in the manufacture of weapons and implements. Broadly speaking, the culture remains of the north of Japan are of a more advanced type than those of the south. The monograph is copiously illustrated with specimens of the early arts, and a map shows the distribution of the Stone-age sites and their elevation above sea-level.

Mr. Munro is a skilled archæologist, and the work he has done in Japan is significant. After many years of excavation and research, he finds two great areas of prehistoric activity—the Yamato and the Ainu. The former occupied the region west of Lake Biwa in the narrowest part of the main island; the Ainu (now known to speak an Aryan language) occupied the east and north. Mr. Munro sums up his conclusions thus:

> The Yamato leaders, if we may judge by the terra-cotta figures which have been left, were not pure Mongolians. Many of these figures exhibit a distinctly Caucasian appearance, and the aristocratic type of Japanese preserves these features to this day. The *beau ideal* of the artists and poets of Japan indicates a prototype of Iranian or other Semitic affinity. . . . The Mongolian element in Japan was an imported, and not an original stock.

JAPANESE DEVELOPMENT OF SOUTH SAGHALIEN.—The Japanese are actively engaged in the work of developing the southern half of Saghalien, which they acquired from Russia by the Portsmouth Treaty. A railroad, thirty miles in length, was opened in December between the port of Korsakovsk and Vladimirovka. It has six stations. Nearly all settlements in the Japanese territory are now connected by telegraph. A Colonial Department for administering Karafuto, the Japanese name for their part of Saghalien, Hokkaido, and Formosa, is to be formed in the Ministry.

CHINESE INFLUENCE IN SIAM.—In his monograph "Le Siam" (Fascicule V of the *Travaux* of the Séminaire de Géographie de l'Université de Liège), Mr. Ernest Robert says that the Chinese influence in Siam is becoming more and more pronounced. The Chinese are especially active in commerce, navigation, and finance, and form in Siam, as in Java, the richest class. Chinese of unmixed blood are comparatively few in number. They come to Siam unmarried, take wives from the native women, and link all their interests with the home of their adoption. Thus Siam is becoming more and more Chinese. The children of these mixed marriages, the "Lukchin," have the best qualities of both races—the vigour, initiative, and energy of the Chinese united with the gentleness and amiability of the Siamese. In the course of a few generations this new type of manhood will be widely spread over Siam. The comparatively weak and apathetic Siamese will have in their blood some of the moral force of their neighbour. In Mr. Robert's opinion, this gradual fusion of the two peoples will, in the present century, have a most beneficial effect upon the Siamese nation.

EUROPE.

ANNALS OF TROPICAL MEDICINE AND PARASITOLOGY.—The Committee of the Liverpool School of Tropical Medicine has issued the first number of a handsome publication with this name, which will replace the series of separate "Memoirs," 21 of which have hitherto been published by the School. The Annals will contain accounts of the various expeditions of the School and of the scientific work done in its laboratories at the University of Liverpool and at Runcorn. Original articles from the outside, on subjects connected with tropical medicine or hygiene, may also be published, so that probably not less than four numbers of the Annals will be issued annually. The subscription price is 10s. 6d. a year. This handsome publication will be welcomed by all who are interested in the development of the tropical regions. The School which issues it is recognized as one of the foremost agencies in the study of tropical diseases and hygiene.

INFORMATION CONCERNING THE GERMAN COLONIES.—The *Kolonial Handels-Adressbuch,* 1907, contains over 200 pages of compact information about the German colonies. This includes the names and addresses of colonial merchants, of societies which are promoting agricultural or other phases of development, lists of colonial officials, freight rates, details of commerce, and a large variety of other facts. If we desire facts relating to the Shantung Railroad, for example, we learn that the company offices are in Berlin, that the line connects the port of Tsingtau with Tsi-nan, its length is 436.4 kilometers, it was opened on June 1, 1904, and there are fifty-two stations on the main line. The distances between the stations and the starting-point, the number of passenger and freight trains, the passenger and freight charges, and the cost of freightage by ox waggon, or porter, from various points of the line are given. In the fulness and excellent arrangement of its contents this Annual is a model for similar publications.

OCEANIA.

PHOSPHATE BEDS ON OCEAN ISLAND.—Ocean Island, also called Paanopa, is in the South Pacific between the Gilbert and Solomon groups—in 0° 52′ S. Lat. and 169° 35′ E. Long. It was annexed to the British Empire in 1900, and is under the jurisdiction of the Administrator of the Gilbert and Ellice Protectorates. It has had no regular connection with the outer world, but was sometimes visited by a small cruiser.

It has now become known through its remarkably rich phosphate beds, which are being mined. As many as six steamers may be seen at once at anchor near this once quiet island and taking in cargoes of the rock.

The phosphate of Paanopa greatly resembles thick coral. It is whitish in colour, very hard, and has every appearance of having been deposited by sedimentation. At first glance the rock would not appear to have commercial value, but the loading of the ships is the best proof to the contrary. The phosphate is treated with sulphuric acid, which changes it to superphosphate, thus increasing its solubility and making its fertilizing qualities fully available. The present markets are Australia, New Zealand, Japan, and Borneo. The English cruiser *Torch* recently took specimens of the phosphate to Suva (Fiji Islands), where they were exhibited at an agricultural fair. There are in the Fiji group a number of small, uninhabited islets which have a formation that, at least, looks like that of the phosphate rock of Paanopa and the discovery of beds would not be especially surprising, as these little islands have not been explored, and Fiji in its "soapstone" is known to have a substance that resembles the Ocean Island phosphate.

This information is taken from the *Mitteilungen* of the K. K. Geog. Gesellsch. Vienna., Vol. 50, No. 1. Ocean Island is mapped in Stieler. No mention of it is made in Reclus's volume on Oceania, nor does its name appear in the Statesman's

Year Book. Vivien de Saint-Martin's Dictionnaire says that the island is circular in form, has twelve or more miles of coast-line, with an area of about ten square miles, and that it is well wooded and a mountain rises in its centre.

VARIOUS.

SEISMOLOGICAL COMMITTEE.—At the New York meeting of the American Association a standing committee in the sections of Geology and Physics was appointed as a Seismological Committee. The members are G. K. Gilbert, Cleveland Abbe, C. E. Dutton, Otto Klotz, L. A. Bauer, John F. Hayford, W. W. Campbell, A. C. Lawson, H. F. Reid, Ralph S. Tarr, C. G. Rockwood, Jr., W J McGee, William H. Hobbs, L. M. Hoskins, and T. A. Jaggar. The *American Journal of Science* says it is desirable to have such a committee available for counsel in connection with legislation providing for the investigation of earthquakes, to guard against unnecessary duplication of studies, to spread information regarding construction suited to earthquake districts, to collect data concerning light and heavy shocks, and to start investigations upon large problems of seismology.

YEARBOOK OF THE CARNEGIE INSTITUTION.—Yearbook No. 5 for 1906 has just appeared. The anthropological work during the past year included the researches of Mr. William Jones of the American Museum of Natural History among the Ojibwa, and especially the translation of a mass of native texts previously obtained. The results of the investigation will soon be ready for publication. The paper will contain myth, tradition, an account of the leading religious ceremonies, and a discussion of the elements at the basis of Ojibwa religious belief. Mr. George A. Dorsey, of the Field Museum of Natural History, of Chicago, continued his investigation among the tribes of the Caddoan stock and submitted the manuscript of the last volume bearing on the mythology of the tribes. The greater part of the year was spent in preparing a manuscript account of the Society and the religion of the Skidi Pawnee. Practically all of the rituals now known have been obtained.

In geology, Dr. T. C. Chamberlin's work embraced some special studies on the former rates of rotation of the earth, on the reversal of deep-sea circulation, and on the fourfold organization of typical atmospheres.

MANUAL OF TOPOGRAPHIC METHODS.—This useful monograph by Mr. Henry Gannett, which was first published in 1893, has just been republished as *Bulletin* No. 307 of the U. S. Geological Survey. It describes the topographic work, instruments, and methods of the U. S. Geological Survey, primarily for the information of the men engaged in this work. On the three scales adopted for the topographic survey sheets the map of the United States, excluding Alaska, will cost about $25,000,000, and at the present rate of progress will require fifty years for its completion. The Twenty-seventh *Report* of the Geological Survey says that the total area covered by the topographic surveys in the United States to the middle of 1906 is 992,601 square miles, or about 32 per cent. of the whole area of the country

THE MOTION OF GLACIERS.—The cause for the motion of glaciers has received much attention, and numerous theories have been proposed. For some time there has been a tendency toward the abandonment of the theory of viscosity, and this tendency has in America received quite an impetus from the publications of Professor Chamberlin. Recently, however, the argument against viscosity has been chalenged with vigour by Mr. Osmun Willcox in a privately printed paper on "The Viscous *vs.* The Granular Theory of Glacial Motion," published at Long Branch, N. J.,

1906. Dr. Willcox considers one by one the arguments which have been advanced against the viscosity theory, and disposes of them with great effectiveness. He shows that the "assumption that crystalline character is incompatible with viscous fluidity" is "without force, in view of the existence of crystalline liquids." He further shows that glacial phenomena are rendered intelligible by the use of the term *fluid* in its mechanical sense. Dealing with the question, as he does, from a knowledge of organic chemistry, Dr. Willcox is able to handle the subject from a standpoint which is not commonly possible for the geologist. After establishing the postulate that a crystalline substance is capable of viscosity, he considers the actual behaviour of ice, and shows clearly not only that it has all the characteristics of viscosity, but that, as a viscous body, it is capable of performing the work with which it is commonly credited. Much attention is then given to the question whether the same can be held to be true of the Granular Theory. Against this he marshals a large body of fact and leaves it in the most unstable position. He points out that the advocates of the granular theory of glacial motion have ignored a vital point —namely, "the relation between the rates of accumulation and dispersal of free energy within a glacier." He furthermore clearly shows that if the conditions postulated by the aid of that theory actually prevailed in nature, "the forward advance of a glacier would be incredibly limited." Dr. Willcox's discussion of the subject is admirable for its convincing character; and it seems quite certain that he has definitely established the theory of viscosity by overthrowing the arguments which have been raised against it. R. S. T.

The *Monthly Bulletin* of the International Bureau of American Republics (Feb., 1907) says that Dr. William R. Shepherd, Professor of History in Columbia University, will visit the leading South American cities this year, as the representative of the University, to meet leading citizens, with a view of acquainting them with the educational resources and opportunities of American colleges and universities. This is in accordance with the new programme of the Bureau to develop closer relations with Latin America on the intellectual and educational as well as on the commercial side.

MR. ELLSWORTH HUNTINGTON has been appointed instructor in geography at Yale University.

A REGULAR MEETING OF THE AMERICAN GEOGRAPHICAL SOCIETY was held at Mendelssohn Hall, No. 119 West Fortieth Street, Tuesday, February 26, 1907, at 8.30 o'clock, P. M.

Vice-President Tiffany in the chair.

The following persons, recommended by the Council, were elected Fellows:

Richard S. Mercer.	Theodore Wentz.
Rudolph Kleybolte.	Dr. E. S. Robinson.

The Chairman then introduced Dr. Frederick A. Cook, who addressed the Society on the Conquest of Mt. McKinley.

Stereopticon views were shown.

On motion, the Society adjourned.